

SIEMENS

MAMMOMAT 300/1000/3000/3000 Nova

SP

Service

Replacements of Parts

Compression Mechanism and Potentiometer (R863)

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General

This instruction describes:

in **Chapter 2** - how to replace the compression mechanism in the compression unit of the mammography systems MAMMOMAT 300 and MAMMOMAT 1000/3000/3000 Nova.

in **Chapter 3** - how to replace the potentiometer R863 - the position transducer of the compression unit.

Components concerned

Components concerned are the compression units/devices normally used on MAMMOMAT 1000/3000/3000 Nova systems, on MAMMOMAT 300 systems and - with some modifications - also used on MAMMOMAT Novation DR systems.

Material numbers

063 86 051 (used for the Sales Item)

065 21 681 (used for the Sales Item)

064 31 725 (used as Spare Part with REP-Status)

If you encounter compression units with material numbers that are not listed here, apply this instruction appropriately. If necessary, contact CS HSC 24.

Tools required

Standard toolkit (including Allen keys with ball-shaped heads).

Resistance Measuring Instrument (e.g. Fluke - with Ohm-meter function).

Documents required

The technical documentation delivered with the corresponding MAMMOMAT system.

Mainly: Maintenance Instruction SPB7-230.105...

Service Program SPB7-230.114...

NOTICE

Strictly observe all safety precautions - as described in the relevant technical documents - during work that involves assembly, disassembly, removal of covers or work under voltage.

Parts included

Repair kit "Compression Mechanism and Potentiometer", Material Number 065 76 214 mainly contains:
(Details in Design Specification 65 76 214 EDS-01S-00)

Item	Description	Amount	Remark
1	Compression mechanism	1	Assembly
2	Tool for compression unit	1	65 76 222
3	Spring pin 2.5 x 14 ISO 8752	2	60 53 656, if needed, because original damaged, see Pos. 98 on Fig. 5.
4	Potentiometer, 2 kOhm 1W, 10% lin.	1	62 35 118
5	Allen key 1.3 mm	1	
6	This repair instruction	1	SPB7-230.841.03.02

Time required

Approximately 1.5 hours for 1 person for exchange of the compression mechanism.
Approximately 3.0 hours for 1 person for exchange of the potentiometer.

Remove the covers from compression unit

- System OFF.
- Pry open the lid on the maximum compression force presetting knob. Loosen the screw underneath the lid and remove the knob (1/Fig. 1).

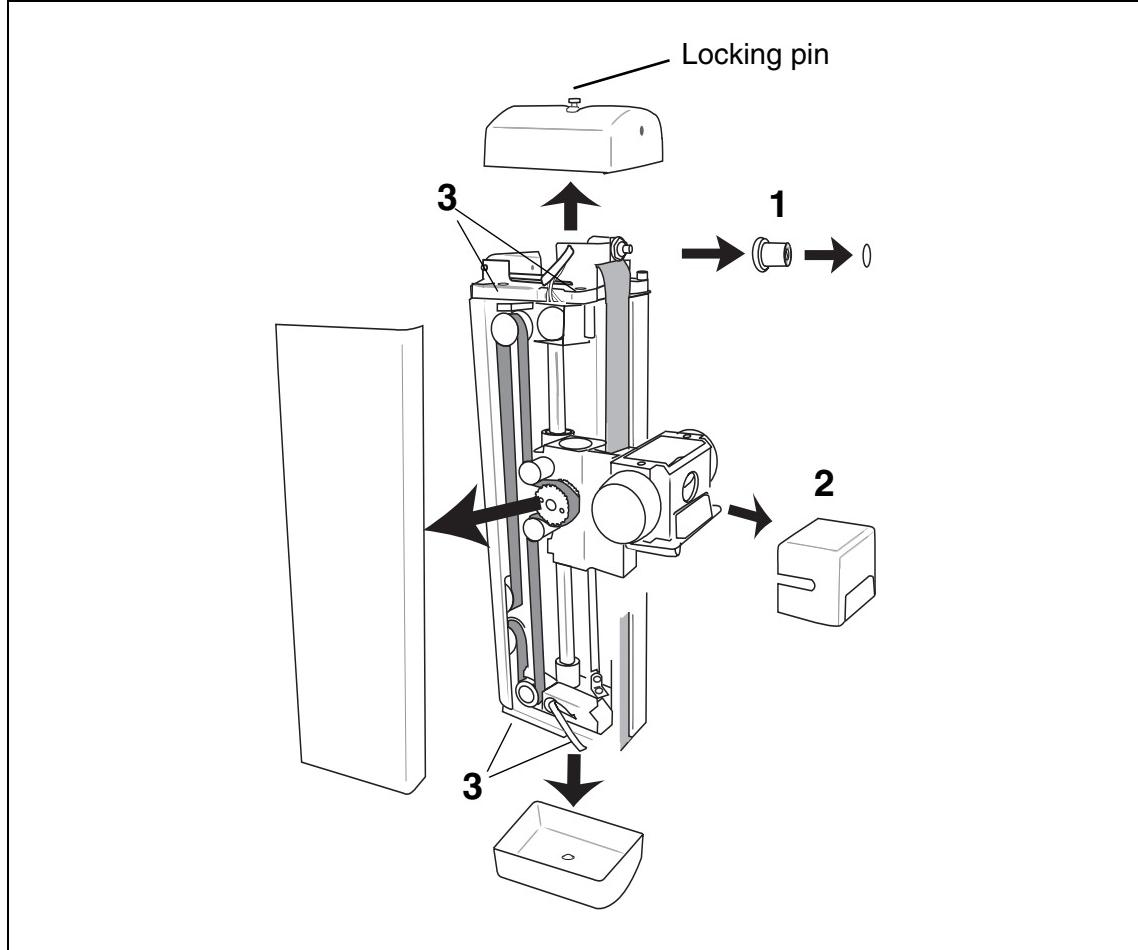


Fig. 1

- Remove the cover from the manual compression/decompression knobs (2/Fig. 1).
- Release the locking pin on the upper and lower cover and remove the covers.
- Loosen the Allen screws on top and at the bottom of the compression unit holding the left side cover (3/Fig. 1). Remove the side cover.

Replace the compression mechanism

- Loosen the Allen screw on the belt tightener and lower the belt tightener (1/Fig. 2).

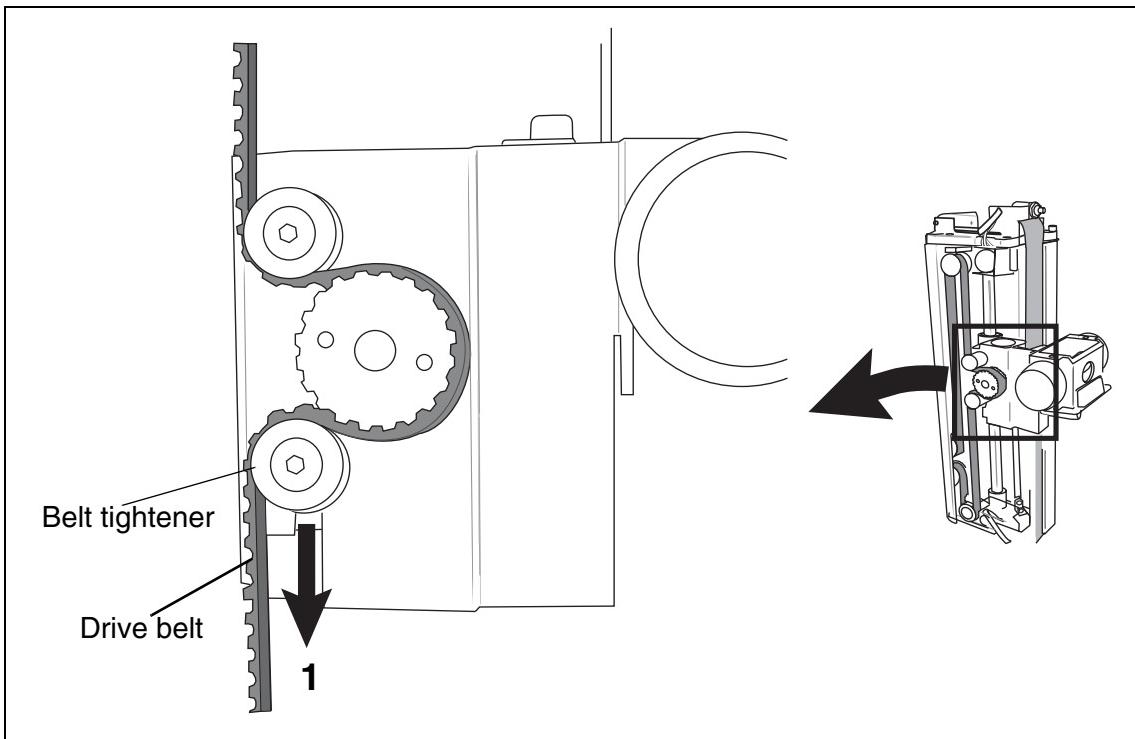


Fig. 2

- Remove the drive belt from the compression mechanism.

- Loosen the Allen screws holding the plate that keeps the curtain in place (1/Fig. 3). Remove the plate and the curtain.

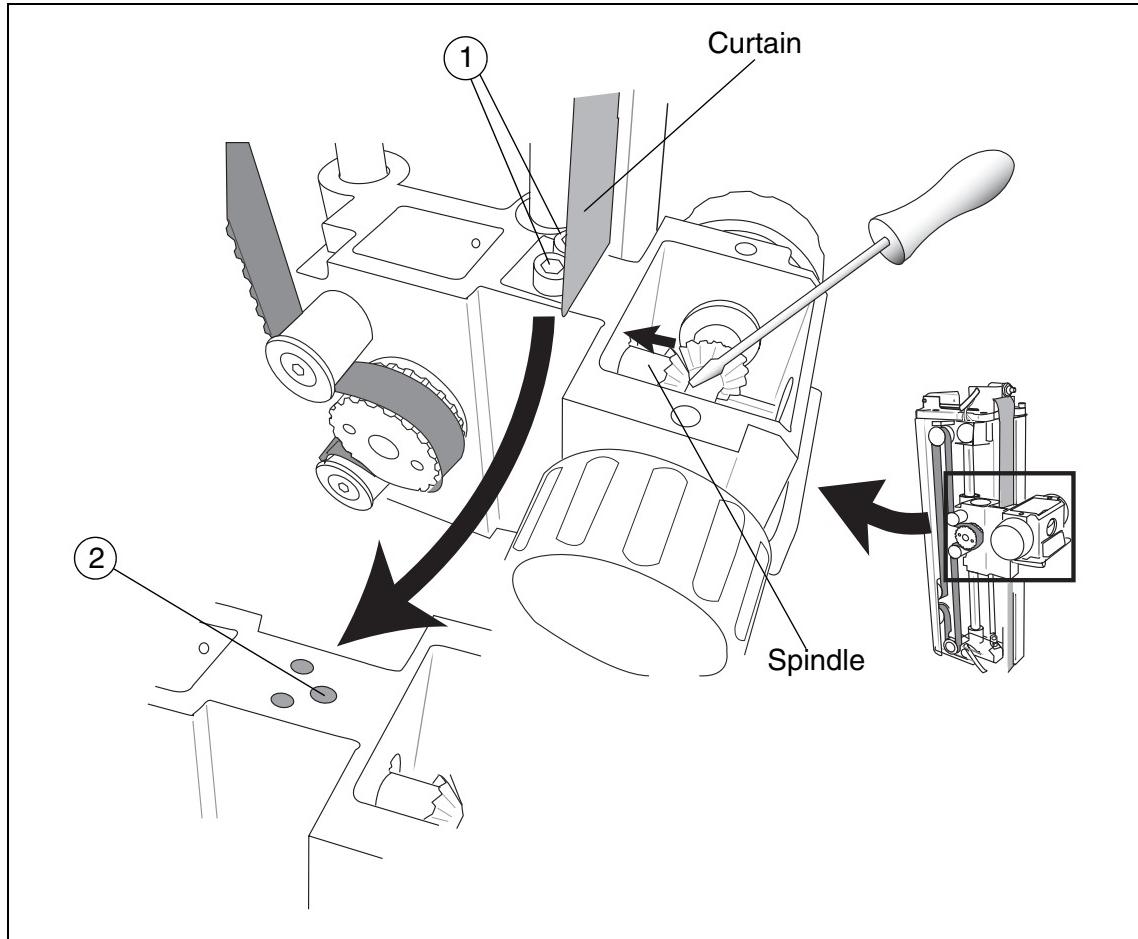


Fig. 3

- Loosen the Allen screw securing the spindle (2/Fig. 3).
- Push the spindle inwards until it reaches the back of the compression unit in order to release the compression mechanism.

NOTE

Ensure that the manual compression/decompression knobs are not in their lowest position. In the lowest position it is not possible to push the spindle fully in towards the back of the compression unit and the compression mechanism will not be released.

- To loosen the compression mechanism, insert the compression mechanism tool into one of the holes on the side of the compression mechanism. Turn the tool around until it slides fully in (Fig. 4).

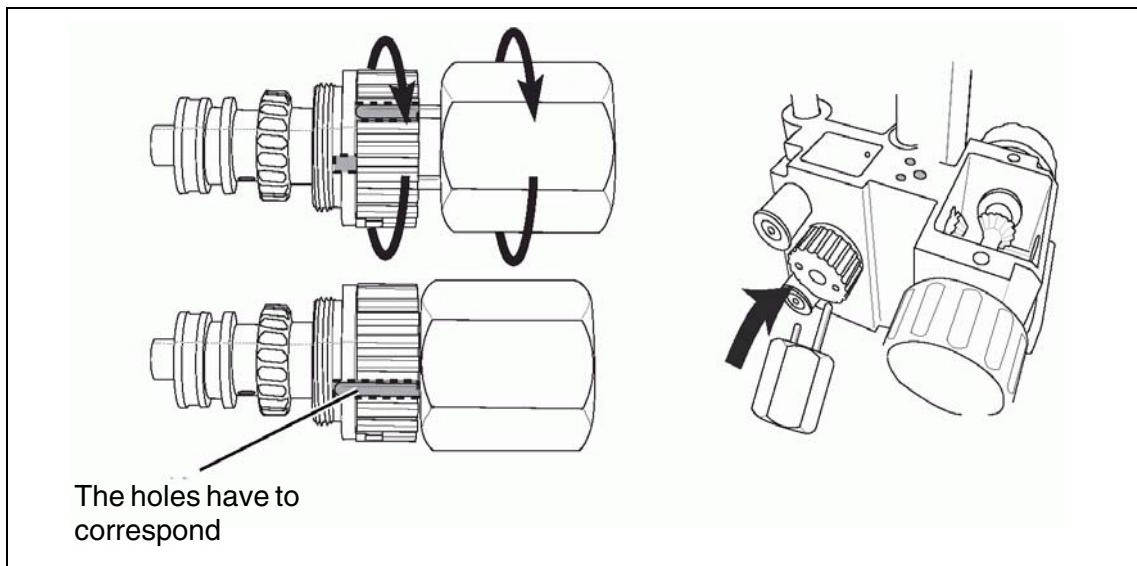


Fig. 4

- Loosen the compression mechanism with an adjustable wrench gripping the compression mechanism tool and remove the compression mechanism.
- Apply threadlocker on the threads of the new compression mechanism and insert it.
- Insert the compression mechanism tool into one of the holes on the side of the compression mechanism and turn the tool around until it slides fully in (Fig. 4).
- Fasten the compression mechanism with an adjustable wrench gripping the tool.

CAUTION

**Be careful when fastening the compression mechanism.
Too much force may damage the brass parts. Such damage will affect the smoothness of operation of the compression unit.**

- Push the spindle back into its original position.
- Fully fasten the Allen screw securing the spindle. Loosen the Allen screw by 180 degrees so it is not completely fastened.

NOTE

If the Allen screw is completely fastened it will prevent the spindle from running smoothly and affect the operation of the compression mechanism.

- Position the curtain in its original place, fit the plate over the curtain and fasten it with the Allen screws.
- Put the belt tightener back and fit the drive belt of the belt tightener and compression mechanism.
- Tighten the drive belt and fasten the Allen screw on the belt tightener.
- Assemble the covers in reverse order.

Test the compression function

Perform the applicable functional tests in the Maintenance Instructions, Chapter 4 (Compression and System Movements). If the tests result in incorrect values, use the service PC to calibrate the compression function. Refer to the instructions in the Service Program document, Chapter "Compression -> Calibration".

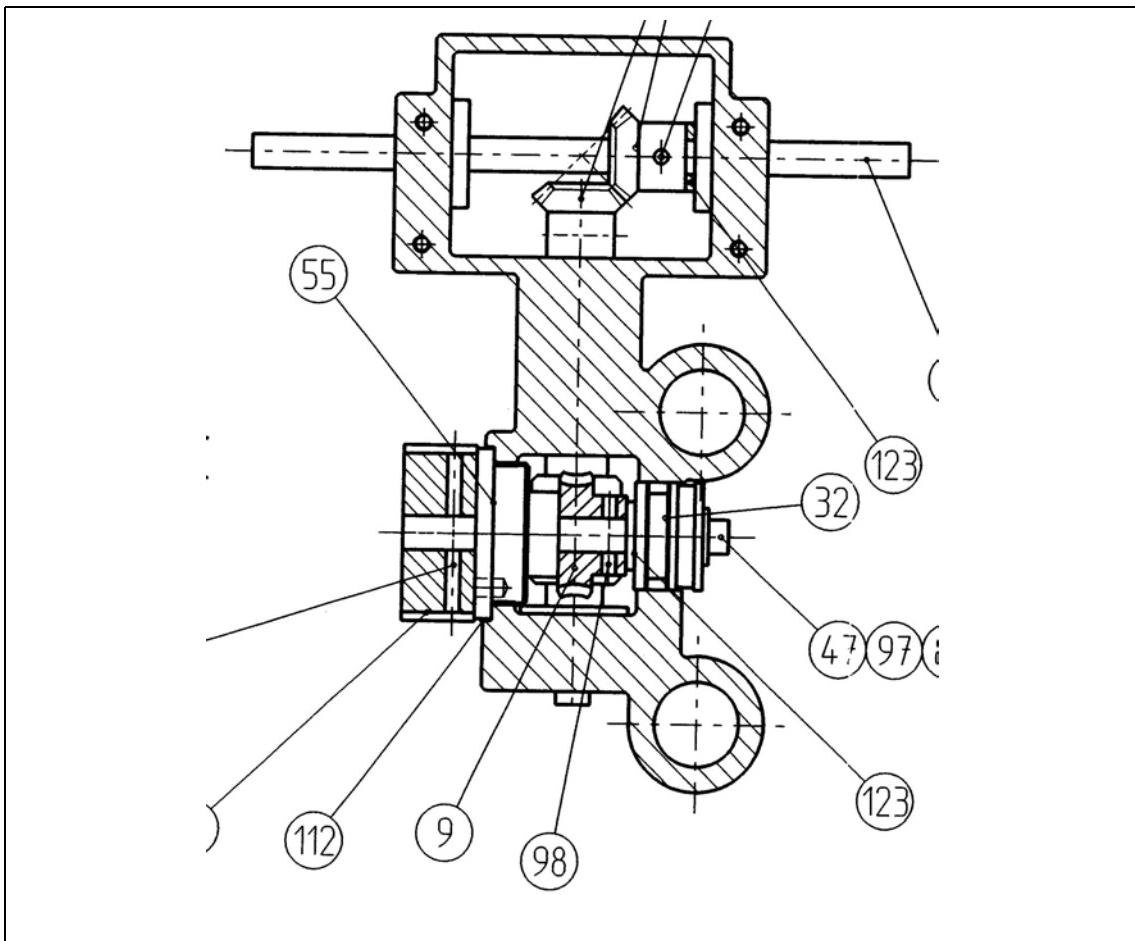


Fig. 5

Instead of exchanging the whole Compression mechanism (gear) delivered, the CSE can decide to insert the spring pin 2.5 x 14 only - if that one was found shorn off. The new Compression mechanism has nowadays a larger pin mounted, (sized 4 x 14 mm), the danger of pin getting broken decreased.

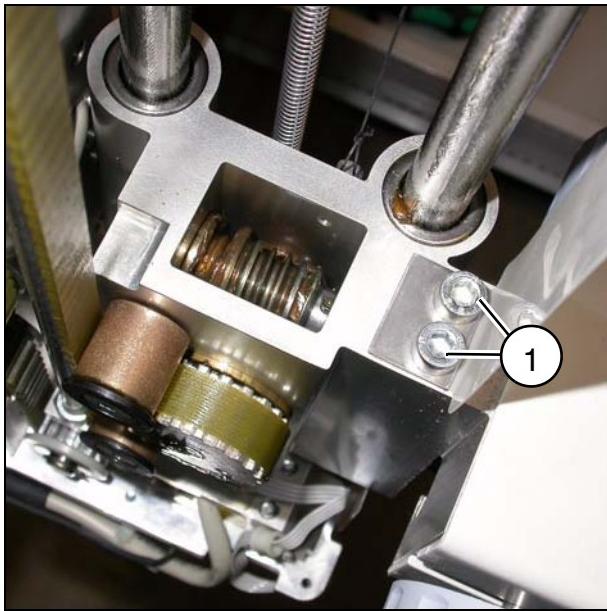


Fig. 1

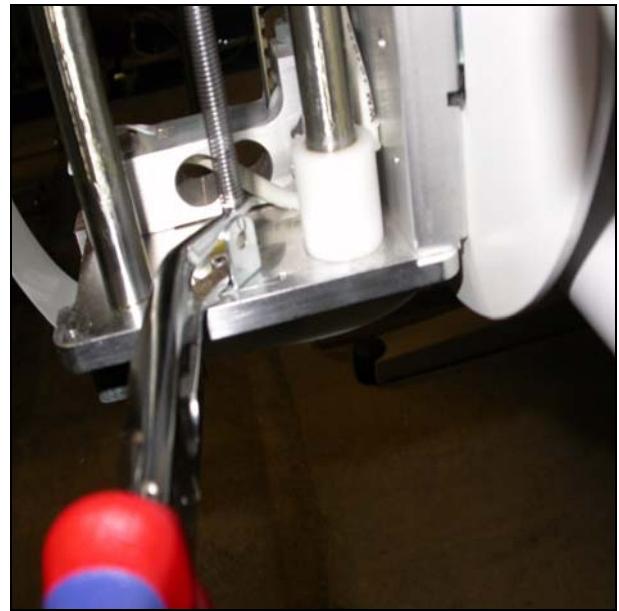


Fig. 2

Exchange of Potentiometer

This part of the instruction describes the exchange of potentiometer R863, the position transducer of the compression unit. Defects on the cord (cord torn, or similar) are considered reason enough to exchange the whole compression unit. Allen keys of 2, 2.5, 3 and 4 mm with ball-shaped heads are needed, one Allen key sized 1.3 mm is supplied with the repair kit to fit the securing radial grub screw of the (Teflon) pulley. The compression unit does not necessarily need to be removed from the MAMMOMAT for this repair.

However, the plastic covers of the tube assembly and of the carrier arm have to be removed. Within the arm, right to the compression unit, the Connector X874 can be found. This connector has to be disconnected when measuring the resistance value of the potentiometer R 863. If it remains connected distorted values will be measured.

Work steps

- Remove tube arm covers, locate the connector X874 within the vertical arm to the right from compression unit, carefully interrupt this connection with the help of a small screwdriver.
- Drive slide manually into a middle position; remove lower cover by pulling the locking pin.
- Remove the lid of the knob of the potentiometer for F-max with the help of a sharp object (e.g. knife), remove rotary knob by unscrewing internal screw. Remove upper cover by pulling the locking pin.
- Mark and then remove the left and right side cover after unscrewing 4 screws on each cover (Note the difference of thread size; 2 x 2 x M4 on the top slab, 2 x 2 x M3 on the bottom slab).
- Remove curtain / filmstrip from the top of the slide by unscrewing the two hex socket head (Allen) screws holding the little plate (1/Fig. 1).

- Unhook (e.g. by long-nose pliers) the lower end of the spiral spring from the rectangular bracket (Fig. 2). Unwind the cord counter-clockwise.
- Unhook and detach the noose on the other end of the cord from the hex socket head screw on the slide (this screw is secured by Loctite and should not be turned), unwind the cord clockwise.

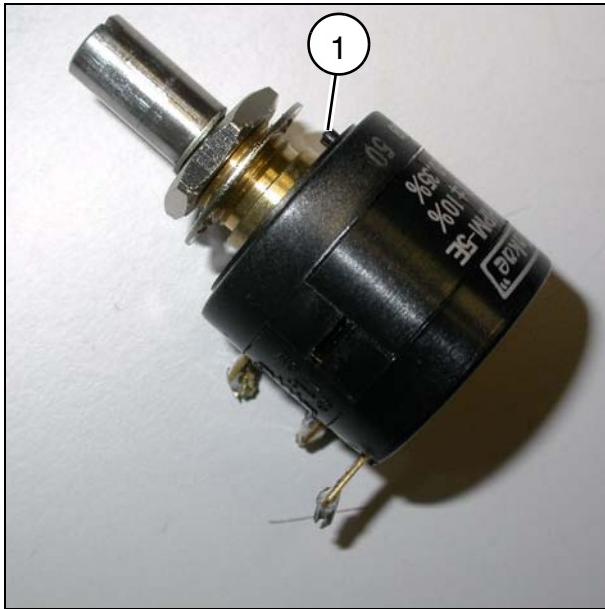


Fig. 3

- Unscrew and remove the two Allen screws fixing the carrier bracket of the potentiometer to the upper slab (1/Fig. 4).
- If necessary, loosen upper cable clamp to enable more free movement of the potentiometer.
- Carefully loosen the securing radial grub screw of the Teflon pulley by means of the supplied Allen key 1.3 mm (1/Fig. 6); pull the pulley off the shaft of the potentiometer. The grub screw is tiny and can get lost easily. Loosen only, don't remove this screw. Having removed the pulley, adjust the grub screw so that it will enable a somewhat tight fitting of the pulley onto the shaft of the new potentiometer.
- Pull the carrier bracket with ball-bearing off the shaft of the potentiometer. It may be a bit difficult if shaft scratched. Note on which side of the bracket the Seeger circlip ring was placed.
- Unscrew and remove the potentiometer from its metal enclosure, if any; note down the numerical and color coding and de-solder the wires (Fig. 3). As help here the usual coding (observe the reality, it can differ!).

Resistor:	1 - with 2 x	grün/green, or orange	wire
Sliding contact:	2 - with 1 x	weiß/white, or grey	wire
Resistor end:	3 - with 2 x	gelb/yellow, or violet	wire

- Attach and solder the wires onto the contact lugs of the new potentiometer. Place it into its metal enclosed observing the position of the little pin (1/Fig. 3) which should prevent its turning; apply the washer and the mounting nut and tighten it.
- Push the carrier bracket with the ball bearing onto the potentiometer shaft, place the assembly onto the upper slab, and tighten the two hex socket head screws.
- Re-attach the upper cable clamp, if necessary; the wires should not touch moving parts (the toothed belt).
- Drive the slide manually down to the lower limit.

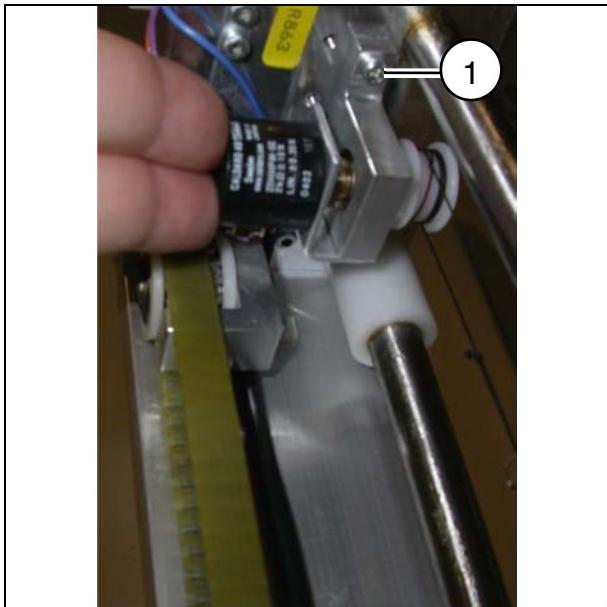


Fig. 4

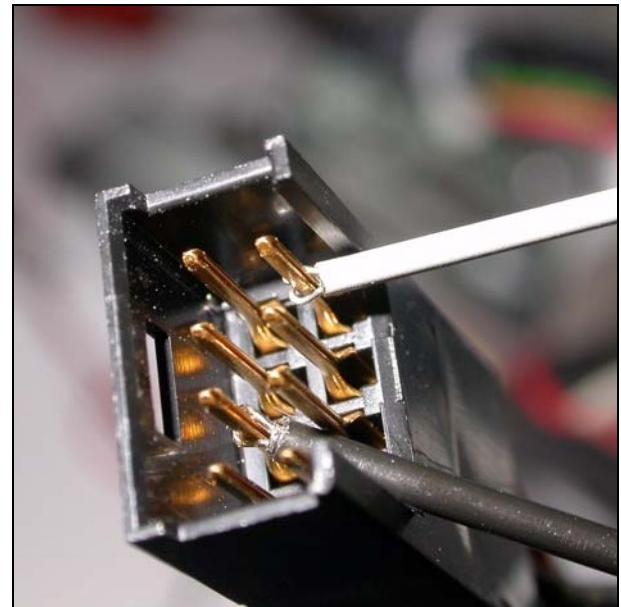


Fig. 5

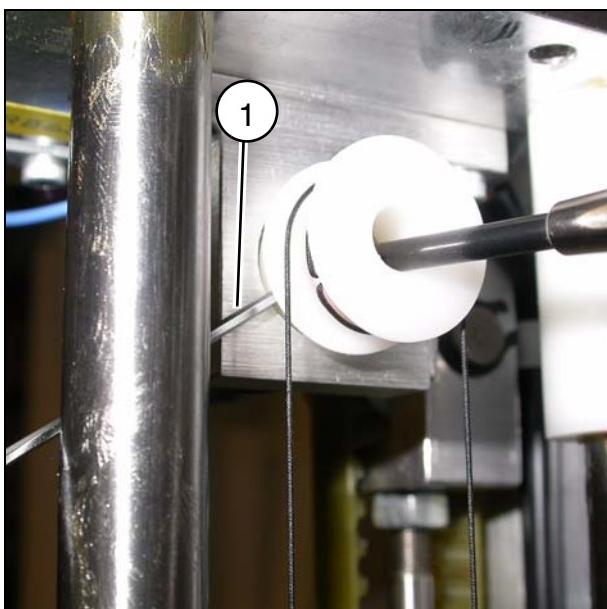


Fig. 6

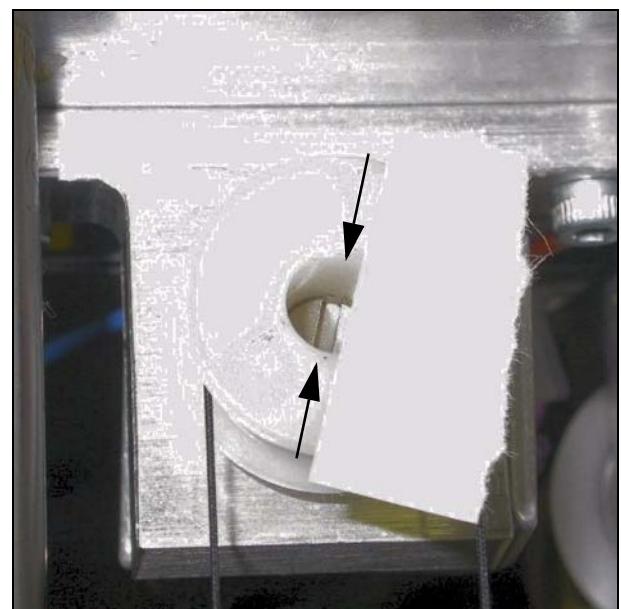


Fig. 7

- Ensure that the potentiometer with its metal enclosure does not fall out of the carrier bracket (Fig. 4) and place the Teflon pulley onto the potentiometer shaft in such a position that the noose of the cord, wound counter-clockwise a bit onto the pulley, can just be hooked back to the hex socket head screw. Hold the pulley and continue with winding the other cord about four (4) turns/windings of 360° , then hook the lower end of the spiral spring back onto the rectangular bracket. (The upper end of the spring will be just some 3 cm from the pulley).



Fig. 8

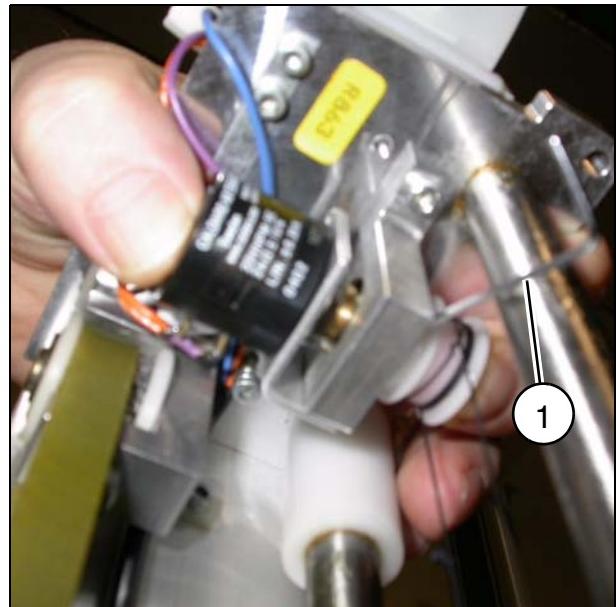


Fig. 9

- Attach an ohmmeter to soldering lugs 1 and 2 of the new potentiometer. As an alternative the corresponding contacts on compression device end of the now disconnected and freely accessible connector X874 can be used (Fig. 5). Adjust the measured resistance applying a screwdriver through the hub of the pulley to the groove on the end of the potentiometer shaft (Fig. 6). Start from a lower resistance value and turn the screwdriver clockwise until reaching $230\text{ Ohm} \pm 20\text{ Ohm}$. On the side of the pulley, mark the exact position of the groove (Fig. 7).
- Hold the potentiometer in place (Fig. 8) and drive the slide manually upwards. During this, look through the pulley hub and observe whether the shaft turns clockwise exactly as the pulley does, and whether the groove and its marked position on the pulley coincide. Help with a screwdriver if the pulley, fixed only lightly, does not turn the shaft. In order to turn the pulley enough to get access to the grub screw, the slide has to go up about two (2) cm. When the grub screw becomes visible from the front, press the pulley gently towards the carrier bracket and tighten the grub screw with the Allen key 1.3 mm (1/Fig. 9).
- Drive the compression slide manually back into its lowest position and check the resistance value again to ensure that it is within tolerance. If necessary repeat the adjustment: For this the grub screw has to be loosened (see previous work step).

- Drive the compression slide manually into its uppermost position. During this observe the cord carefully to determine whether the winding of its one end and the unwinding of its other end occurs freely. It is essential that the winding cord does not obstruct the unwinding one. If this is not the case, disentangle the windings of the cord on the pulley. In the uppermost position, read the resistance measured, typically it will be around 1435 Ohm.
- Drive the slide fully down and re-check the resistance to ensure it is still within limits, i.e. 230 Ohm \pm 20 Ohm.
- The procedure of driving the slide down and up and concurrently observing the winding and unwinding of the cord, and then checking the resistance value at the lower limit, can be repeated one or two times. The adjustment can be considered successful if the measured resistance value is within the given tolerance; more important: the assembly was successful if the winding/unwinding of the cord works well.
- Attach the curtain / filmstrip back onto the slide.
- Mount the left and right side cover.
- Fix the upper cover with locking pin; mount the knob and its lid back onto the shaft of the potentiometer for F-max.
- Attach the lower cover. Reconnect securely the connector X874. Insert the connector back into the space within the vertical part of the arm.
- Proceed with the calibration of compression as described in the paragraph Compression Calibration, in the Chapter: Adjustment and Service Program, document print No. SPB7-230114.03, (mainly Thickness top/bottom).
- Re-attach the plastic covers of the tube assembly.
- Demonstrate the unit in working condition and hand over to customer.

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